

### **REMARKS/ARGUMENTS**

This Amendment is in response to the Office Action mailed October 29, 2003, in which Claims 1-21 were rejected. Applicants would like to thank the Examiner for a timely and thorough review of the above-referenced patent application. Original Claims 1-21 have been canceled and New Claims 22-44 have been added to more clearly define the invention, as explained more fully below. It is respectfully submitted that in light of the arguments and claim amendments, the application is now in condition for allowance.

### **Drawings**

The Office Action objected to Fig. 1, which did not include labels and was not described in the detailed description of the specification. An amended Fig. 1 is attached as Appendix A and includes a label "5" for the inlet duct mentioned in the background of the specification. Amended Fig. 1 has also been labeled as prior art. Likewise, amended Fig. 2 has been labeled as prior art and is attached as Appendix B. Furthermore, the background of the specification has been amended to more accurately describe Fig. 1 in the background of the invention. The description of Fig. 1 was the description of Fig. 1 that was provided by the Brief Description of the Drawings on page 10, line 10 of the application as originally filed. Accordingly, Applicants respectfully submit that Fig. 1 and its description in the background overcome the objection.

The Office Action included a Notice of Draftsperson's Patent Drawing Review, PTO-948, which objected to Figs. 2 and 3 for having poor line quality. Applicants respectfully advise that formal drawings, including Figs. 2 and 3 will be provided upon an indication of allowable subject matter.

### **Rejections Under 35 U.S.C. § 112**

The Office Action rejected Claims 1-21 under 35 U.S.C. § 112 as failing to comply with the enablement requirement. Claims 1-21 were alleged to contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to make or use the invention. Applicants have canceled Claims 1-21, and Applicants have added new claims 22-44

to more accurately describe the present invention. The subject matter of the new claims is described in the specification such that one skilled in the art is enabled to make or use the invention. Therefore, Applicants respectfully submit that the rejection of Claims 1-21 for failing to comply with the enablement requirement is moot in light of the cancellation of Claims 1-21 and that new Claims 22-44 comply with the enablement requirement.

The Office Action also rejected Claims 1-21 under 35 U.S.C. § 112 as being indefinite. The term “globally optimized” was alleged to be a relative term that rendered Claims 1, 8, and 15 indefinite. Furthermore, Claims 1, 8, and 15 included the limitation “optimizing the 3-D ply definition” which was alleged to have failed to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Applicants have canceled Claims 1-21, and Applicants have added new claims 22-44 that do not include the terms “globally optimized,” “optimizing the 3-D ply definition,” or the like. New independent Claims 22 and 31 do include “design optimization tools” which are described in the specification and are known in the art. Accordingly, Applicants respectfully submit that the rejection of Claims 1-21 for indefiniteness is moot in light of the cancellation of Claims 1-21 and that new Claims 22-44 are sufficiently definite to comply with 35 U.S.C. § 112.

#### **Rejections Under 35 U.S.C. § 102(b) – Morelle**

The Office Action rejected Claims 1, 2, 4, 5, 7-9, 11, 12, 14-16, 18, 19, and 21 under 35 U.S.C. § 102(b) as being anticipated by the article Patrick Morelle, R. Radovic, “CAD based optimization of composite structures,” Proceedings of Sixth Int. Conference on OPTI, March 16-18, 1999, pgs. 311-320 (hereinafter “Morelle article”). To the extent that this rejection would be applied against the new Claims, Applicants would respectfully traverse.

The Morelle article discloses a composite design optimization process that generates a globally optimized 3-D ply definition for a laminate part, optimizes the 3-D ply definition, subsequently generates a feedback signal, modifies the 3-D ply definition responsive to the feedback signal, and includes other features enumerated by the Examiner. Applicants respectfully submit that the rejection of Claims 1, 2, 4, 5, 7-9, 11, 12, 14-16, 18, 19, and 21 is

moot in light of the cancellation of Claims 1-21. Applicants also respectfully submit that new Claims 22-44 include recitations that are not disclosed or suggested in the Morelle article.

New independent Claim 22 recites a method that includes “providing true 3-D geometric tow definition of individual tows of the composite to the closed loop design system,” which is not disclosed or suggested in the Morelle article. The Morelle article is concerned with the plies, or layers, of the composite and is not directed to individual tows of the composite. In addition, the Morelle article does not disclose or suggest providing true 3-D geometric tow definition. Furthermore, the Morelle article does not disclose or suggest “translating the final design into a form understandable by a fiber placement machine” as claimed in Claim 22. Accordingly, Applicants respectfully submit that new Claim 22, and Claims 23-30 which depend therefrom, are not disclosed or suggested by the Morelle article, either individually or in combination with any or all of the other cited references.

New independent Claim 31 recites a method that includes “analyzing material properties of tows of each layer of the composite structure by drilling normal to the composite structure in any local area of the composite structure.” The Morelle article does not disclose or suggest “drilling” the composite structure in a normal direction to analyze the material properties of each layer of the composite structure. Furthermore, the Morelle article does not disclose or suggest “translating the final design into a form understandable by a fiber placement machine” as also claimed in Claim 31. Accordingly, Applicants respectfully submit that new Claim 31, and Claims 32-44 which depend therefrom, are not disclosed or suggested by the Morelle article, either individually or in combination with any or all of the other cited references.

#### **Rejections Under 35 U.S.C. § 102(b) – Ward**

The Office Action rejected Claims 1, 2, 4, 5, 7-9, 11, 12, 14-16, 18, 19, and 21 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,006,990 to Ward et al. To the extent that this rejection would be applied against the new Claims, Applicants would respectfully traverse.

The Ward '990 patent discloses a composite design optimization process with various features as enumerated by the Examiner. Applicants respectfully submit that the rejection of

Claims 1, 2, 4, 5, 7-9, 11, 12, 14-16, 18, 19, and 21 is moot in light of the cancellation of Claims 1-21. Applicants also respectfully submit that new Claims 22-44 include recitations that are not disclosed or suggested in the Ward '990 patent.

New independent Claim 22 recites a method for manufacturing composite structures comprising individual tows and includes "providing true 3-D geometric tow definition of individual tows of the composite to the closed loop design system," which is not disclosed or suggested in the Ward '990 patent. The Ward '990 patent is directed to designing and manufacturing composite structures on the ply-level, whereas the present invention of new Claim 22 is directed to designing and manufacturing composite structures on the tow-level. A ply comprises many tows, such as hundreds or thousands of tows, that are impregnated in a resin system to define the ply. By designing and manufacturing a composite structure at the tow-level, the composite structure may be manufactured using a fiber placement machine that provides performance and manufacturing advantages described in the background of the present application that are not provided by typical ply stacking machines. Therefore, the present invention of Claim 22 provides true 3-D geometric tow definition of individual tows of the composite to provide a final design that may be manufactured by a fiber placement machine. Accordingly, Applicants respectfully submit that new Claim 22, and Claims 23-30 which depend therefrom, are not disclosed or suggested by the Ward '990 patent, either individually or in combination with any or all of the other cited references.

New independent Claim 31 recites a method for manufacturing composite structures comprising individual tows and includes "analyzing material properties of tows of each layer of the composite structure by drilling normal to the composite structure in any local area of the composite structure," which is not disclosed or suggested in the Ward '990 patent. Although the Ward '990 patent does disclose pierce point data for structural interrogation of a composite structure, the Ward '990 patent does not disclose analyzing material properties of tows by piercing normal to the composite structure. The Ward '990 patent provides material properties on the part-level and ply-level only, such as thickness and properties of the part and tables defining the area, weight, and centroid of each ply, respectively, because the Ward '990 patent is directed to designing and manufacturing composite structures on the ply-level. The present

invention of Claim 31 provides material properties at the tow-level to provide a final design that may be manufactured by a fiber placement machine as described above. Accordingly, Applicants respectfully submit that new Claim 31, and Claims 32-44 which depend therefrom, are not disclosed or suggested by the Ward '990 patent, either individually or in combination with any or all of the other cited references.

**Rejection Under 35 U.S.C. § 103(a)**

The Office Action rejected Claims 3, 6, 10, 13, 17, and 20 under 35 U.S.C. § 103(a) as being unpatentable over the Ward '990 patent in view of U.S. Patent No. 5,636,338 to Moreton. The Office Action also rejected Claims 3, 6, 10, 13, 17, and 20 under 35 U.S.C. § 103(a) as being unpatentable over the Morelle article in view of the Moreton '338 patent. To the extent that this rejection would be applied against the new Claims, Applicants would respectfully traverse.

The Moreton '338 patent discloses a lagrange optimizer which was claimed in Claims 3, 6, 10, 13, 17, and 20 which have been canceled. New Claims 22-44 do not claim a lagrange optimizer. Accordingly, Applicants respectfully submit that the rejection under 35 U.S.C. § 103(a) of Claims 3, 6, 10, 13, 17, and 20 is moot in light of the cancellation of Claims 1-21 and that new Claims 22-44 are patentable over the Ward '990 patent or the Morelle article in view of the Moreton '338 patent.

### CONCLUSION

In view of the foregoing remarks, Applicants respectfully submit that all of the Claims of the present application are in condition for allowance. It is respectfully requested that a Notice of Allowance be issued in due course. Examiner Perez-Daple is encouraged to contact Applicants' undersigned attorney to resolve any remaining issues in order to expedite examination of the present application.

A fee of \$36.00 is enclosed with the amendment for the net addition of two claims. It is not believed that fees for extensions of time or additional fees for net addition of claims are required. However, in the event that additional extensions of time or fees for net addition of claims are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fees required are hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

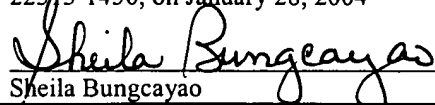


Keith A. Roberson  
Registration No. 52,171

**Customer No. 00826**  
**ALSTON & BIRD LLP**  
Bank of America Plaza  
101 South Tryon Street, Suite 4000  
Charlotte, NC 28280-4000  
Tel Charlotte Office (704) 444-1000  
Fax Charlotte Office (704) 444-1111

#### CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on January 28, 2004

  
Sheila Bungcayao